HOUSING DEMAND IN A TRADITIONAL MARKET: MOSCOW

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ABSTRACT

Before Russia began its transition toward the market, its housing sector was perhaps the most controlled in the world. This paper employs data from a 1994 survey of Moscow households to estimate housing demand functions to evaluate whether behavior is consistent with market principles. Statistically significant, robust income elasticities are found for families who have engaged in recent market housing transfers. Insignificant results are found for those renting state-owned units. Families who have engaged in market housing transfers are smaller, younger and wealthier than other families in Moscow and end up living in less crowded conditions than state renters. The use of per capita living space as a proxy for market value, as has been done in previous studies of housing in Russia and the Soviet Union, is also evaluated.

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Transformation of the housing sector in the Russian Federation is well underway. Indicators include:

- By the end of 1994, 40 percent of the state housing stock in Moscow (32 percent in Russia) had been privatized, i.e., sitting tenants had taken ownership of their units, with the full right of disposition (Kosareva et al., forthcoming). In 1991, state rentals constituted 90 percent of units in Moscow (two-thirds of all units in the country).

- A large body of reform legislation has been passed at the national level and implementation of much of it proceeds. For example, in 1994 all localities began five-year programs to raise rents (fees for maintenance and communal services) to cover full operating costs within five years. At the same time they implemented a federally designed housing allowance program—the first national means tested program in the country (Struyk and Kosareva, 1994).

- Partly as a consequence of more units being available in the market due to privatization and the pressure on overhoused renters to shift to smaller units, household mobility rates have increased markedly. Household survey data for seven large cities show an increase in mobility rates from 1.8 percent in 1992 to 4.6 percent in 1993 (Struyk and Romanik, 1995).

- There is clear evidence that families with effective demand can readily find units in the market. This is based on the experience of Russian officers returning from the Baltics who participated in a special program using a certificate they were given to purchase housing; the certificate was priced at the cost of a modest unit in a local market and had to be used within a six month period. Nearly all certificates were used much earlier than the deadline in a total of eight markets.[1]

The Russian housing market is clearly in a period of very rapid change. While an increasing share of all housing transactions are on a market base, a large state presence remains. Sometimes the state role is explicit, as in the maintenance of waiting lists for municipal (state-owned) housing and the allocation of these units. In other cases, such as with the relationship of privatized former state construction companies and municipal and *oblast* (regional) construction companies, the state role is more subtle.

The income elasticity of demand is a key parameter for policy analysis. It can also be a good indicator of the workings of the market. Studying the period prior to legal privatization, several analysts have obtained insignificant income elasticity estimates for Russia and conclude that this is because the market could not overcome the heavy hand of Soviet control (Buckley and Gurenko, 1995). Alexeev (1988), on the other hand, produced estimates showing a positive income demand elasticity for housing — and argued that the market was working in spite of government attempts to the contrary.

In this article, we use data collected for Moscow several years after the legalization of market-based housing transfers to test for evidence of market behavior. We first compare the characteristics

of families which have privatized their units or engaged in housing market transfers with families which maintain state ownership of their residences. We then look at recent movers who obtained their new units through market purchases and exchanges to estimate a conventional housing demand function. The case for using recent movers is strong in this instance, since the majority of movers are having to search in the market to find housing. We also contrast the demand model results for recent market movers with state renters whose housing is generally assigned through administrative allocation systems. Additionally, we estimate a demand function using a model consistent with that estimated by Malpezzi and Mayo (1987) to contrast the income elasticities found in Moscow to elasticities found in cities in other countries. Finally, we use our new data to comment on the Buckley and Gurenko and the Alexeev studies. Because those studies were conducted before a legal housing market existed, the authors relied on living space per capita as a measure of housing value. We use market values from our data to test the relationship of living space to market value.

Our results can be summarized succinctly. We find that families which have engaged in market housing transfers are younger and wealthier than other households in Moscow, and are generally smaller families and have acquired housing which provides them less crowded conditions. Using a variety of housing demand models, we find a positive and significant income elasticity for recent movers trading in the market. By contrast, models replicated on the pool of state renters find no stable relationship of housing value and income. These models are generally not robust, suggesting allocations among state renters are not consistent with conventional market distributions. Converting our model for consistency with estimates for other cities in Malpezzi and Mayo, we estimate a statistically significant income elasticity of 0.27 among recent movers obtaining housing

through the market. While this is not the lowest income elasticity among the cities studied, it is below most estimates, which typically range from 0.4 to 0.6.[2] However, because our point estimate is based on a small number of observations, we cannot rule out that it the true elasticity for Moscow is within this range. Finally, we find that living space is only one of several housing characteristics which have an important influence on the market value of housing. Holding other characteristics constant, the number of rooms in a unit, the unit's location, and the floor to ceiling height have a similar or greater influence on market value. In short, living space alone is a poor proxy for unit value or rent. We also replicate our prior demand equations using living space per capita as the dependent variable and obtain results of little value.

II. Data and Methods

We use a 1994 survey of over 2,200 households in Moscow as the basis for this analysis. The survey was conducted under supervision of The Urban Institute as part of the Housing Sector Reform Project. The survey is the third panel of annual interviews of occupants of dwelling units in the municipality of Moscow. The first survey was in December of 1992 and included a strictly random, self-weighting sample of state rental units only. The December 1993 sample added a proportional sample of cooperatives to cover the full housing stock.[3] The 1994 sample adds a sufficient number of newly constructed units to keep the sample representative. The survey focuses on current housing conditions, tenure and expenditures, residential mobility, and household demographics, including income and occupations. Core blocks of questions are asked every year; "guest" blocs are rotated in and out. Occupants are asked to report purchase prices if they purchased their unit within the last two years, or to estimate their unit's value if they are familiar with similar units sold within the last year.

This study draws exclusively on data from the 1994 survey. The majority of units can be classified into one of four primary groups:[4]

1. State renters: units which remain state property, have not been privatized and have not been exchanged on the market during the last two years.
    1. Privatized, original occupant: units which have been converted from state property to private ownership, and have not been traded since privatization.

2. Purchasers: units which have been transferred since 1992 through either a sale on the secondary market or an exchange transaction involving side payments. [5]
3. Market renters: privatized units occupied by families paying market rents.

We had hoped to obtain sample sizes large enough to support estimation of a demand function for both purchaser units and market rental units. Unfortunately, there were too few units in the survey paying market rents to estimate a rental demand function for Moscow. Further, reports of actual purchase prices were sparse. For purchasers who do not report their actual purchase price, we substitute their estimate of market value. We consider these imputed values reliable because we only obtain estimates of housing values from residents who are familiar with units similar to their own which have been sold during the last year. This familiarity establishes some knowledge of values for units like their own. It is also important to note that while ruble inflation has been a serious problem in the Russian economy, the price of real estate in Moscow has remained fairly stable in U.S. dollar terms. For this reason, we have collected all housing values in terms of U.S. dollars, which is the conventional means for pricing in the market.

We have 39 purchaser units which report the actual purchase price or an estimated value based on knowledge of sales of similar units. While this sample is smaller than we would have preferred, we would emphasize that these units are quite homogenous. Similar analyses which draw larger samples are often used to estimate functions for whole countries or for regions with mixes of urban and rural units. All of the units in this analysis are apartment flats within the city of Moscow. We further restrict variation in units used in the analysis by including only single units (we eliminate communal flats) and units which have central heat. Furthermore, we eliminate units and buildings characterized by the interviewer as needing major rehabilitation and cases where interviewees were

characterized as not well informed. We also excluded several units where the value per meter seemed unreasonably high or low.[6] These standards create a small but fairly homogenous and reliable group of observations.

We estimate a series of demand functions for this group. There is an extensive literature on functional forms, model specification and related issues for housing demand, and we follow the conclusions of this literature in specifying our models (Mayo, 1981; Polinsky, 1977; Malpezzi and Mayo, 1987). The primary series of models we estimate regresses the log of unit value against the log of household income and a series of household and demographic characteristics. Among these demographic characteristics is a dummy variable which designates households where any member's current or previous occupations is among those traditionally "preferred" or favored by the state. These preferred occupations are directors, managers, and skilled workers at state owned enterprises, and members of the military and security services. It has been shown that workers in these occupations were given preferences under the state allocation of housing (Puzanov, 1993; Hamilton, 1993). We estimate the same series of models on state renters who estimate the value of their units to contrast the importance of income and demographic characteristics under the old rationing schemes and the emerging market.

The model we replicate from Mayo and Malpezzi regresses the log of the rental equivalent of unit value against the log of income, household size, and the square of household size. This makes it necessary to convert our market values for the sale of units to rental values. To obtain a rental equivalent, we estimated rent and value hedonic models using all units reporting actual or estimated

values and rents, and generated a ratio of rent to values for the average unit in the survey. This model allows us to compare the income elasticity we find for owners in Moscow with those of cities in other developing and developed countries. We also use these hedonics to comment on the use of living space per capita as the dependent variable in the demand functions of Alexeev and Buckley and Gurenko.

III. Results

Income elasticity for market transactions and state rentals.

Characteristics of families by tenure. We begin by comparing the housing demand functions of families who have obtained their units through purchase or exchange in the emerging secondary market with those who obtained housing through the socialist system of allocation. Before examining results of the demand functions, we compare households across unit types.

Table 1 compares family incomes, size, age, occupations, space, and crowding by the housing categories described above. The majority of units remain state rental properties. About 40 percent of units have been privatized or traded or rented on the market since 1992, however. Units which have been privatized or have changed occupants through market transactions are significantly less crowded. Using standards based on those defined by the Moscow Department of Municipal Housing for the housing allowance program, 44 percent of units held by state renters are overcrowded, compared to between 18 and 29 percent of other units. Families in state rental units also tend to be larger: State renters average 3.2 family members, while other units have fewer members, as shown. Crowding in Moscow's housing stock is also characterized by the number of three-generation families sharing a single unit (often a 2-room apartment). Twenty-two percent of state rental units have three generation residents, compared to 0 to 14 percent in units which have been privatized or exchanged through the market since 1992.

While units occupied by recent movers are similar to privatized units in terms of crowding and family size, they are substantial differences between recent mover units and both privatized and state

rental units. Families which have held on to the units they privatized have incomes lower than state renters who have not privatized and lower than families in units which have been traded or rented on the market: Average monthly incomes among privatized original occupants is 544,000 rubles, relative to 666,000 rubles among state renters, 971,000 rubles among purchasers, and 1,588,000 rubles among market renters.[7] Purchasers and market renters are significantly more likely to be from the highest income groups in Moscow: 54 percent of purchasers and 82 percent of market renters are from the highest income tercile relative to 38 percent of state renters and 25 percent of other privatized units. There is also a clear ranking of unit types by age: on average, the oldest member of privatized original occupant households the age is 62, relative to 53 among state renters, 44 among purchasers and exchangers, and 38 among market renters.[8]

While all units other than state rental units are occupied by smaller families and are less crowded, families which have rented or traded units on the market are clearly younger and have higher incomes than families in units which have not been traded on the market. When the vast majority of housing moves and transactions were controlled by the state, young families, even young married couples, typically shared apartments with their parents or other relatives. Regardless of their incomes, young families were officially not able to get on waiting lists for apartments of their own unless the units they shared met the official definition of overcrowding. Once on the waiting lists, these families usually waited several years to obtain their own units. These findings suggest that an early effect of the private market for housing has been improved mobility for these younger, smaller families, many of which have gained substantial incomes in the transitional economy.

Demand by purchasers and state renters. Ideally, we would like to be able to estimate demand functions for both buyers and market renters. However, as noted, there are too few market renters on the file to estimate demand for rental housing. Of the 99 buyers on the file, 39 have reported housing values and have met other standards for inclusion in our model. To contrast the performance of the emerging housing market to the former socialist means of allocating housing, we estimate the same models for the 137 state renters which report housing values.

The first panel of table 2 show results of a series of five demand equations applied to buyers. Income is significant in each of the models we estimate, despite the fact that our small sample limits degrees of freedom. The income elasticity is in the .27-.32 range across the models, indicating the estimated value is quite robust. Equation 2 adds employment in preferred occupational categories. Under the socialist system of allocation, persons with these professions were given choice units. Throughout the series, preferred occupation has an apparent positive effect on housing values, but is not statistically significant. Equation 3 adds family size and the age of the oldest member. Family size is often significant in demand functions because larger families will often pay for larger units to avoid crowding. Age is often important to housing demand because it provides more opportunity for wealth accumulation; in Russia it influences allocation because older people have had more time on waiting lists, and so may have obtained better units. Neither of these characteristics have a significant coefficient for purchasers, however. Equation 4 substitutes the square of family size, and equation 5 includes both family size and its square. In each case, only income is significant.

The significance of income in each specification provides evidence of traditional market behavior among housing buyers in the Moscow economy. It is unusual, however, that family size is not significant. We have shown that Muscovites obtaining housing through the market are younger, have smaller families, and have higher incomes. Again, these results suggest that the "new Russians" who have prospered in the transitional market economy are the major players in the housing market. For these smaller, younger families, income is a greater influence on housing value than family size.

The second panel of table 2 shows results of the same models for state renters. Income is significant (at the 10 percent level) only in the first equation, where there are no other independent variables. In equation 2, preferred occupation categories are added and are significant. Preferred occupational groups lose significance when family size or the square of family size is added in equations 3 and 4. In the last equation, which includes each of the independent variables examined, none of the individual variables is significant.

Overall, the model results for state renters are not very robust. Further, the better of these models — equation 3 — shows heteroskedasticity, with the variance of residuals increasing as units' log-value is lower or higher than the mid-range. These results suggest not only that income is not significant under the Soviet system of housing allocation, but that the system results in distributions which cannot be easily understood or interpreted using analyses traditionally applied to market systems. This is consistent with the findings of studies of the allocation system under the old regime (Matthews, 1979; Morton, 1980).

Income Elasticity: Moscow relative to the other cities

In their 1987 paper, Malpezzi and Mayo standardize models of housing demand in 14 cities in eight developing countries and 2 American cities.[9] The model regresses the log of rent on the log of income, family size, and family size squared. We have duplicated this model for the purchaser units analyzed in the previous section.

To convert value estimates to rents, we estimate two hedonic functions, one for rents and one for values, and estimated a ratio of values to rents.[10] Table 3 shows the coefficients from these equations, the averages of the unit characteristics used in the models, and the implied rent and value for a unit with average characteristics. The hedonic models are estimated using units whose occupants provided actual or estimated rents or market values regardless of their actual tenure. As mentioned, estimates of rents and values are obtained only if the respondent is familiar with units similar to their own unit which have been rented or sold within the previous year. We find that the average rent for units included in this analysis[11] is 341 U.S. dollars per month, and the average value is 41,126 U.S. dollars. This implies a rent to value ratio of 0.0083.

We apply this ratio to the market values used for the 39 units in the demand analysis and replicate the model used in Mayo and Malpezzi. Our results for Moscow are compared to those in other cities in Table 4. The point estimate of income elasticity for Moscow — 0.27 — is low relative to other cities. Cairo is the only city from a developing nation with a lower point estimate. While the income elasticity is low relative to other cities, the intercept is among the highest of cities analyzed:

Only the intercept estimate for Kwangju, Korea is higher. This indicates that purchasers in Moscow have a high average propensity to consume, but a lower than usual marginal propensity to consume.

This pattern of high intercept and low income elasticity is typical of markets where the most basic housing units — the "minimum housing bundles" — are high priced. To enter the market and purchase a units — any unit — in Moscow is quite expensive. Purchasers have to extend themselves just to acquire the minimum; once they have this they may not want to invest their remaining economic resources in housing to avoid excess concentration of their portfolio. In Moscow, many of those purchasing units are likely businessmen who want to keep some of their capital available for investing in business. Notice that the high intercept low elasticity pattern is also present in Korea, which is characterized by extraordinarily high housing prices (per unit of asset) because of severe controls on the conversion of rural land to urban purposes, and a fairly large minimum housing bundle to be purchased due to climate and density (high rises are the rule in large cities). (Green, et al., 1994; Kim, 1993).

Living space as dependent variable.

Several papers have tried to determine if Russians were able to circumvent the strict regimen of housing allocation under the socialist system prior to the legalization of private ownership of unit. Alexeev (1988) used data from interviews of Soviet émigrés to estimate a demand function for housing throughout Russia. He found a significant coefficient on incomes, and posits that despite strict controls on housing which should not be influenced by family incomes, Soviets were able to

circumvent the rationing system through bribes or exchanges involving side-payments. Thus a market-like distribution existed despite strict controls. Buckley and Gurenko (1995) use 1992 national survey data to test whether income influences housing quality in state-owned housing. They find no relationship between income and unit size.

Our objective has been different. We have not been focused on whether Muscovites have been able to circumvent a system which outlaws market behavior. Rather we have identified a group known to have made legal market-based transactions, and have tried to measure income elasticity for this group. We have also tested these models on state renters to contrast the significance of incomes in the allocation of housing among these units. This does not directly relate to the issues addressed in these prior studies, however. We cannot directly test the hypotheses offered in these papers using data from the post-privatization period. In 1994, those who wish to circumvent the administrative allocation system have legal means to do so. Therefore, they may no longer be in the "state renters" group we analyzed earlier.[12] While we cannot directly test the hypothesis that Soviets were able to circumvent the administrative system, we believe our data bring some insights on the prior work.

Specifically, we can use our data to better understand the limitations of the dependent variable used in these analyses. The Alexeev and the Buckley and Gurenko studies used living space per capita as the dependent variable in their models of housing demand. The authors acknowledge that this single metric is a limited measure of unit value. Clearly other attributes, including location, condition of the unit interior, etc. effect unit value. If higher income families can use their money to acquire better housing, space per person would be only one of the attributes they would consider.

Market values, such as those obtained in our data, incorporate all important aspects of unit value . But before private ownership of housing was legal, units did not have a "market value;" so it would have been difficult for these authors to develop a more comprehensive metric incorporating all the relevant characteristics.

The hedonic models detailed in Table 3 provide insight on the relative importance of uni t characteristics. Those results show that while living space is an important component of unit value, access to telephones, floor to ceiling height, number of rooms, the floor within the building, an d location also bare a statistically significant effect on unit value. In table 5, we use the results of the hedonic models to demonstrate the importance of each of these characteristics in relation to market value. We find that a unit with median characteristics is valued at $42,610. If we change the unit size to the 10th and 90th percentile, the marginal change in unit value is a decrease of 13 percent and an increase of 23 percent, respectively. A unit's living space is clearly an im portant element of unit value. But changing the number of rooms has an effect of similar magnitude: all else equal, changing from two rooms to one decreases value by 19 percent, and increasing to 3 increases value by 24 percent. Similarly, location can swing the value of the median unit on the order of 11 to 14 percent. Floor to ceiling height and telephone access have important effects on value as well. [13]

We can also test how well living space per capita serves as a dependent variable by replacing log of value used in the demand models from table 2 with the alternative dependent variable. Results from this test are shown in table 6. The results raise concerns about the usefulness of living space per capita as a dependent variable.

The first panel of table 6 shows model results for the same 39 buyer units included in our earlier demand model. Intuitively, if there is any group of Muscovites who are capable of using their income to secure preferable units, it would be these individuals who are known to have made market-based housing transactions. And previously, we found strong evidence of a statistically significant relationship between incomes and housing values for this group. Using living space per capita as a proxy for unit value, however, we do not find any such relationship. In fact, only models 3 and 5 reveal any significant relationships, and these are related to family size.

The second panel shows the model for the state renters group. (As mentioned, state renters in 1994 are likely to be a very different group from those in Alexeev's data. So we are not trying to replicate his model, we are only testing the use of living space per capita as the dependent variable.) In equations 1 and 2, we find a significant negative relationship between income and living space per capita. When we add other characteristics in the remaining models, the income term becomes insignificant (except in equation 4) and changes sign. Notice also that the introduction of family size variables significantly increases the explanatory power of the models — from R-squares of 0.05 to R-squares near or exceeding 0.5. Taken together, the change in results across equations suggests that income is significant only because it is positively correlated with family size and inversely correlated with age. This seems likely given that income initially has a negative sign and loses its significance when these other variables are introduced. Intuitively, this pattern results from crowding in multi-generational household units when the older nuclear family is middle-aged and the over housing of pensioners after their children receive a unit of their own. The dramatic increase in R-

square values when family size is introduced suggests that the high R-square Alexeev reports may be a function of the strong relationship between space per capita and household size.

While these results do not resolve any questions about whether or not Russians could circumvent administrative allocation of housing in the period prior to legal privatization, it does point up some concerns about earlier analyses used to test this theory. First, we have shown that unit size is a poor proxy for unit value. Second, we have shown that using unit size per capita as the dependent value in a demand function produces results which are generally not useful. However, we have a further concern related to the models from these earlier studies. There is clearly a relationship between living space *per capita* on the left hand side of the equation and *family size* on the right hand side. Essentially, family size is on both the left and right side to the regression. This relationship helps to explain why the R-squareds in the models for state renters increases significantly when family size is introduced. The endogeneity of one of the independent variables introduces a strong possibility that model results — even the coefficient on income — may be invalid, particularly given the correlation between income and family size.

IV. Implications/conclusions

Our primary conclusion is that even at this early stage of the transition to a normal housing market, the behavior of Muscovites in the housing market — as indicated by the income elasticity of demand for housing — is broadly similar to that of households in a range of countries with well-established housing markets. The estimated elasticity of about 0.3 is in the lower part of the range of values obtained by Malpezzi and Mayo applying the same model to cities in seven countries. This finding should be interpreted in light of the stage of development of the housing market. The data presented show that the number of households purchasing a unit in the open-market in a year is still not large. In part this is because of the nearly total absence of long-term housing finance, although this is partially offset by the large home equity holdings of many purchasers achieved through housing privatization. An average house price-to-annual income ratio of about 17 clearly also acts as a powerful break on demand. The results reviewed suggest that just having sufficient financial resources to acquire an acceptable unit is the major hurdle and that buyers do not systematically extend themselves beyond this level to a great extent. Income elasticities might well be higher if smaller "housing bundles" that still met minimum aspirations were readily available, but this does not appear to be the case. This contrasts with many developing countries, including those listed in Table 4, where "informal" housing markets provide lower cost options for would-be purchasers. As illustrated in Table 5, the principle trade-offs in Moscow are between unit size and location. Consistent with the foregoing, market participants are concentrated among a select group of "new

Russians," i.e., a group of comparatively young adults with small families who have benefited significantly during the transition.

As we point out in the article, this research was limited because their were few households included in our data who rented or purchased units in the market. This is clearly related to the fact that the private market for housing rents and trades in Russia is in its infancy. An estimate of demand among renters and an improved model for purchasers may be obtained from future panels of the Moscow housing survey as more families acquire housing through the market. Alternatively, analysts could employ data from a survey designed specifically to sample households trading on the market. But even in its infancy, the private market for housing in Moscow shows strong evidence a relationship between housing value and family income — a hallmark of market economic behavior.

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The range cited from Malpezzi and Mayo (1987) include studies using samples of recent movers and of all households regardless of length of tenure. A general review of income elasticity studies is in Malpezzi, Mayo, and Gross (1985).

At the start of the transition, in Moscow the entire housing stock consisted of state rentals (90 percent) and cooperatives (10 percent), except for less than 1 percent in other tenure forms. A description of the survey is given in Romanik (1995).

About 13 percent of units do not fit into any of these categories. These units are primarily privatized cooperatives.

In addition to units purchased outright, this group includes units obtained through an exchange with a non-relative. Before privatization of unit became legal in 1990, unit exchanges were frequently a means of achieving a market-like exchange of housing. These exchanges usually involve the exchange of units and an additional side payment or exchange of other goods (a car, for example) to compensate the owner of the better unit for their move to the lessor unit. These exchanges, when conducted with a non-relative, are generally consistent with market purchases in terms of equalizing income and unit values. While it is no longer necessary for households to go through the cumbersome process of exchanging units, they can avoid substantial taxes on capital gains by doing so. Also note that when occupants of state rental units now exchange flats, it is really a market transaction since both parties can privatize their units after the exchange. Again,

they avoid taxes by exchanging and then privatizing.

We eliminate units with values less than $340 per square meter and greater than $5,000 per square meter.

In November 1993 the exchange rate was 3,234 rubles to the dollar. Using this rate, incomes for the month convert to about $168 for privatized original occupants households, $206 among state renters, $300 among purchasers, and $491 among market renters.

The finding that families in privatized original occupant units are older and have lower incomes is consistent with other research on privatization of housing in Moscow. Daniell, Puzanov, and Struyk (1993) finds that pensioners (over the age of 55) are more likely to privatize than younger occupants. Because many of these older families are retired, it follows that they would have lower incomes. One reason older families are more likely to privatize is the desire to will a flat to an heir.

Malpezzi and Mayo model demand for owners in only 12 of the 14 cities from developing countries.

The studies in Malpezzi and Mayo use a variety of methods to convert owner's values to rental equivalents. This variation in methodology somewhat compromises the comparability of results for owners across cities.

Specifically, self-contained units with central heat, excluding units and buildings the interviewer characterizes as needing major rehabilitation. Interviewees characterized as usually not well informed are also excluded. In addition, we eliminated units with values

per meter or rents per meter which seemed to be outliers before estimating the hedonic models.

However, if state renters had successfully circumvented administrative allocations prior to 1990, many of these residents would remain in the state units they obtained. We include persons who have obtained state rental units through exchanges with side payments in the market exchange group, but only if they moved after 1992. So if circumvention had been widespread, the stock of state renters could still show a distribution influenced by family incomes.

It is likely that telephone access and ceiling height are proxies for other characteristics. Lack of phone access may indicate buildings which are in new districts (mikso-raions) where phone service has yet to be installed. The new districts are in the distant suburbs, typically high-rise panel housing where the quality of the finishing work is extremely bad, often taking years for the occupant to repair. Ceiling height is a summary indicator of building quality: at the extremes are the well-built, high-ceiling units of the Stalin era and the 5-story walk-up, cramped, low-ceiling units built in the Krushchev era.